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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/894,225	06/27/2001	Aaftab A. Munshi	0269518 BEL-031	4829

7590 07/16/2003  
PILLSBURY WINTHROP LLP  
1600 Tysons Boulevard  
McLean, VA 22102

EXAMINER

SEALEY, LANCE W

ART UNIT	PAPER NUMBER
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2671

DATE MAILED: 07/16/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/894,225

Applicant(s)

MUNSHI, AAFAB A. 

Examiner

Lance W. Sealey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 June 2001.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5,9-14,18-22,24-26,28-33,35-37,39-43,45-47,49 and 50 is/are rejected.
- 7) ☒ Claim(s) 6-8,15-17,23,27,34,38,44 and 48 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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## **DETAILED ACTION**

### ***Allowable Subject Matter***

1. Claims 6-8, 15-17, 23, 27, 34, 38, 44 and 48 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. No prior art anticipates or suggests the object visibility rules specifying a relationship between light sources and certain rays, the ray tracer looking up a rule associated with one of the light sources when processing the certain rays for the light source (claims 6 and 15); or the ray tracer constructing a ray tree or using a ray tree for any other purpose (claims 8, 17, 23, 27, 38 and 48). Claims 7 and 16 are allowable because they depend on claims 6 and 15, respectively.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of 35 U.S.C. 102(b) which forms the basis for all novelty rejections set forth in this Office action:

A person shall be entitled to a patent unless—

- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 12, 28, 39 and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by the user guide for Artifice Inc.'s DesignWorkshop CAD software ("DesignWorkshop").

4. DesignWorkshop discloses, with respect to claims 1 and 12, a graphics apparatus (Macintosh; see section 2.1, "A Simple Modeling Environment", second paragraph) comprising a

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plug-in rendering system (DesignWorkshop) that renders an object in response to a graphics input (see section 3.1.2, "Creation Tools" and section 5.1.1, "Material Types"), the graphics input including object visibility rules (example of these can be found in the parameters for the Tiled\_Texture command, section 5.1.1, include specularly and opacity, and rules are inherently attached to these characteristics), the rendering system constraining the rendering of the object in accordance with the object visibility rules (specularity and opacity contribute to the visibility of the object).

5. Concerning claim 2, 28, 39 and 49, DesignWorkshop further discloses its use as a modeling system (section 2.1, "A Simple Modeling Environment", first paragraph).

6. Therefore, in view of the foregoing, claims 1, 2, 12, 28, 39 and 49 are rejected as being anticipated under 35 U.S.C. 102 by DesignWorkshop.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negated by the manner in which the invention was made.

8. Claims 3-5, 9-11, 13-14, 18-22, 24-25, 29-33, 35-36, 40-43, 45-46 and 50 are rejected

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under 35 U.S.C. 103(a) as being unpatentable by DesignWorkshop in view of Elmquist et al. (“Elmquist”, U.S. Pat. No. 5,299,298).

9. As alluded to in the rejection of claim 1, DesignWorkshop inputs specify characteristics such as specularity and opacity to which visibility rules inherently attach, including such inherent rules as the penetrability of rays through objects with different degrees of opacity; or the fact that more intense light will shine more intensely on objects, and will therefore make those objects more visible, than less intense light (claims 3 and 13, “relationship between the object and certain rays”); or the fact that light will shine less intently on object 2, when object 1 is partially blocking the light from shining with its full intensity on object 2 (claim 4, “relationship between the object and certain other objects with respect to certain rays”). But DesignWorkshop does not disclose, with respect to claims 3, 4 and 13, a ray tracer looking up a rule associated with the object when processing the certain rays. However, this element is disclosed by the Elmquist accelerated shadow testing method at col.8, l.43-col.9, l.12.

10. Therefore, it would have been obvious to one of ordinary skill in the art at the time this invention was made to incorporate the Elmquist method in the DesignWorkshop modeling/rendering system. This would provide a more efficient illumination technique for three dimensional rendering (Elmquist, col.1, ll.7-11).

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11. The rest of the claims in this rejection will now be considered. Concerning claims 5 and 14, Elmquist discloses a ray originating from a point of intersection with an object at col.8, ll.45-57.

12. Regarding claims 9, 18, 24, 35 and 45 Elmquist discloses a relationship between the object and certain rays wherein the relationship establishes objects to be excluded from processing for the certain rays at col.8, ll.32-42 (if the light and the point are not on opposite sides of the plane, the potential shadower (i.e., shadowing object) corresponding to the plane must be eliminated as an actual shadower, i.e., the light source (ray) will not process that object).

13. With respect to claims 10, 19, 25, 35 and 46, Elmquist discloses objects to be included for processing for the certain rays to the exclusion of all other objects in col.8, ll.47-52.

14. Concerning claims 11, 29, 30, 40 and 50, DesignWorkshop discloses a modeling system adapted to construct the object visibility rules in accordance with user inputs (see section 3.1.2, "Creation Tools" and section 5.1.1, "Material Types").

15. Regarding claims 20, 31 and 41, DesignWorkshop discloses a scene server that receives a graphics input specifying a plurality of objects and extracts object visibility information from the graphics input (input: see section 3.1.2, "Creation Tools" and section 5.1.1, "Material Types"; output: see section 2.1, "A Simple Modeling Environment", first paragraph), and Elmquist discloses a ray tracer coupled to the scene server that determines intersections of rays with certain of the plurality of objects included in a scene, the ray tracer receiving the object visibility

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information and constraining the ray intersection determination in accordance therewith (col.8, ll.32-42, 47-52).

16. With respect to claims 21, 32 and 42, DesignWorkshop inherently discloses object visibility rules, and Elmquist discloses relationships between the objects and certain rays, the ray tracer constraining the ray intersection determination for the certain types of rays in accordance with the specified relationships at col.8, ll.32-42 (if the light and the point are not on opposite sides of the plane, the potential shadower (i.e., shadowing object) corresponding to the plane must be eliminated as an actual shadower, i.e., the light source (ray) will not process that object).

17. Concerning claims 22, 33 and 43, Elmquist discloses shadow rays at col.8, ll.32-42.

18. Therefore, in view of the foregoing, claims 3-5, 9-11, 13-14, 18-22, 24-25, 29-33, 35-36, 40-43, 45-46 and 50 are rejected as being unpatentable under 35 U.S.C. 103 by DesignWorkshop in view of Elmquist.

19. Claims 26, 37 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable by DesignWorkshop in view of Elmquist and further in view of Arias (U.S. Pat. No. 5,966,134).

20. Neither DesignWorkshop nor Elmquist disclose a shader coupled to the ray tracer for determining colors associated with the intersections; this element is disclosed by the Arias method for simulating cel animation and shading at the third sentence of the Abstract.

21. Therefore, it would have been obvious to one of ordinary skill in the art at the time this invention was made to incorporate the Arias shader in the DesignWorkshop-Elmquist

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modeling/rendering system. This would facilitate the avoidance of aliasing artifacts (Arias, Abstract, last sentence).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lance Sealey whose telephone number is (703) 305-0026. The examiner can normally be reached Monday-Friday from 7:00 am to 3:30 pm EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached on (703) 305-9798. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

**Any response to this action should be mailed to:**

MS Non-Fee Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**or faxed to:**

**(703) 872-9314 (for Technology Center 2600 only)**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,  
Arlington, VA, Sixth Floor (Receptionist).

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700 or the Customer Service Office at (703) 306-0377.

Respectfully submitted,

*Lance W. Sealey*

Lance W. Sealey, examiner